



Unit Plan

3.7 Two-dimensional Shapes and Perimeter

Chester / Littleville Elementary / Grade 3 / Mathematics

Week 28 - Week 30 | 4 Curriculum Developers | Last Updated: Mar 19, 2024 by LeBlanc, Deanna

[Style Guide](#)

What is the purpose of the unit? What are the major take-aways?

Standards

MA: Mathematics (2017)**MA: Grade 3****Operations & Algebraic Thinking****3.OA Multiply and divide within 100.**

- 7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two single-digit numbers and the related division facts. For example, the product $4 \times 7 = 28$ has related division facts $28 \div 7 = 4$ and $28 \div 4 = 7$.

3.OA Solve problems involving the four operations, and identify and explain patterns in arithmetic.

- 8. Solve two-step word problems using the four operations for problems posed with whole numbers and having whole number answers. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. [Show Details](#)

Number & Operations in Base Ten**3.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic.** [Show Details](#)

- 2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.

Measurement & Data**3.MD Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**

- 8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Geometry**3.G Reason with shapes and their attributes.**

- 1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Compare and classify shapes by their sides and angles (right angle/non-right angle). Recognize rhombuses, rectangles, squares, and trapezoids as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

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1. **Multiplication and Division Mastery**: Students understand that multiplication and division are inverse operations that are fundamentally related. They recognize that mastering the multiplication tables enables quick retrieval of division facts, supporting their ability to solve more complex problems efficiently.
2. **Problem-Solving with Operations**: Students recognize that mathematical problems can often be approached using more than one operation (addition, subtraction, multiplication, division) and that two-step word problems may involve a combination of these operations. Students will understand how to interpret these problems and how to choose and apply the appropriate operations to find solutions.
3. **Addition and Subtraction Fluency**: Students grasp the importance of fluency in adding and subtracting within 1000, comprehending that such skills are essential for tackling higher-level math concepts and real-world mathematical challenges. Strategies derived from place value understanding and properties of operations are key tools in their mathematical toolkit.
4. **Place Value and Multiplication Strategies**: Students understand that place value knowledge is foundational for understanding how to multiply one-digit numbers by multiples of 10. They realize that these strategies are based on recognizing the value of digits depending on their place and how those values change when multiplied by 10.
5. **Perimeter Understanding**: Students develop a deep understanding of the concept of perimeter as a measurable attribute of polygons. They realize that finding a perimeter requires either adding up all the side lengths or applying multiplication for regular shapes. They also appreciate that different shapes can have the same perimeter but different areas, and vice versa, leading to richer discussions about the properties of shapes.
6. **Application and Estimation**: Students will understand that estimating and assessing the reasonableness of answers are crucial steps in problem-solving. Through practice with these skills, they become better equipped to verify their answers and understand the context within which the math operates.

1. How can understanding multiplication and division within 100 help us calculate the perimeter of polygons?
 - How do multiplication and division facts support us in solving problems related to shape perimeters?
 - Why is it important to know multiplication and division facts by memory when dealing with perimeter problems?
2. How do we use addition and subtraction to solve real-world problems involving the perimeters of polygons?
 - Why are addition and subtraction skills crucial when calculating the perimeter of two-dimensional shapes?
 - When finding the perimeter of a shape, how do we determine when to add or subtract side lengths?
3. What strategies can we use to multiply single-digit numbers by multiples of 10, and how does this relate to the concept of perimeter?
 - How does knowledge of place value enhance our ability to multiply and understand the perimeter of shapes?
 - Can you provide examples of how multiplying by multiples of 10 is used in real-life perimeter calculations?
4. How do we solve two-step word problems involving the four operations, especially when calculating the perimeter of polygons?
 - What methods can we use to break down a two-step word problem when finding a shape's perimeter?
 - How do we represent a word problem involving perimeter with an equation that includes an unknown quantity?
5. How can we use mental computation and estimation strategies to assess the reasonableness of our answers when working with perimeters?
 - In what ways can rounding help us estimate the perimeter of a polygon?
 - Why is it important to check the reasonableness of our perimeter calculations, and how can we do that?
6. How do different properties of shapes result in different perimeters and areas, even when some dimensions are the same?
 - What happens to the perimeter of a rectangle if we keep one side length constant and change the other?
 - Can two shapes have the same perimeter but different areas? How can we demonstrate this with rectangles?

Content

In this unit, students reason about attributes of two-dimensional shapes and learn about perimeter. Students began to describe, compare, and sort two-dimensional shapes in earlier grades. Here, they continue to do so and to develop language that is increasingly more precise to describe and categorize shapes. Students learn to classify broader categories of shapes (quadrilaterals and triangles) into more specific sub-categories based on their attributes. For instance, they study examples and non-examples of rhombuses, rectangles, and squares, and come to recognize their specific attributes.

Skills

Section A Goals

- Reason about shapes and their attributes.

Section B Goals

- Find the perimeter of two-dimensional shapes, including when all or some side lengths are given.

Section C Goals

- Solve problems involving perimeter and area, in and out of context.

Section D Goals

- Apply geometric understanding to solve problems.

Students also expand their knowledge about attributes that can be measured.

Previously, they learned the meaning of area and found the area of rectangles and figures composed of rectangles. In this unit, students learn the meaning of perimeter and find the perimeter of shapes. They consider geometric attributes of shapes (such as opposite sides having the same length) that can help them find perimeter.

As the lessons progress, they consider situations that involve perimeter, and then those that involve both perimeter and area. These lessons aim to distinguish the two attributes (which are commonly confused) and reinforce that perimeter measures length or distance (in length units) and area measures the amount of space covered by a shape (in square units).

At the end of the unit, students solve problems in a variety of contexts. They apply what they learn about geometric attributes of shapes, perimeter, and area, to design a park, a West African wax print pattern, and a robot. They then solve problems within the context of their design.


Throughout the unit

The warm-ups throughout the unit are used to address topics within each section and continue to support the fluencies of grade 3. Warm-ups that are not focused on the grade-level fluencies address the learning in the specific sections. In section A, warm-ups focus on using attributes of triangles and quadrilaterals to describe and analyze shapes. In sections B and C, warm-ups focus on perimeter. In the last section, students consider how geometric attributes, perimeter, and area can be used in design.

How will you gauge student learning?

Assessments

3.7 End-of-Unit Assessment | Summative | Written Test

 [Grade3-7-End-of-Unit-Assessment-assessment.pdf](#)

[2 State Standards Assessed](#)

How will students learn?

Learning Activities

Section A:

In this section, students describe, compare, and sort a variety of shapes. They have previously used terms such as square, rectangle, triangle, quadrilateral, pentagon, and hexagon to name shapes. Here, students think about ways to further categorize triangles and quadrilaterals. They see that triangles and quadrilaterals can be classified based on their sides (whether some are of equal length) and their angles (whether one or more right angles are present).

Although students will not learn the formal definition of an angle until grade 4, they are introduced to the terms “angle in a shape” and “right angle in a shape” to describe the corners of shapes. This allows students to distinguish right triangles and to describe defining attributes of squares and rectangles.

Students come to understand that a shape can have more than one name if it has the attributes that define different types of shapes. They also see that some quadrilaterals aren't squares, rhombuses, or rectangles because they don't have the defining attributes of these shapes.

Section B:

In this section, students are introduced to the idea of perimeter. Students begin to conceptualize perimeter as a measurable geometric attribute with a concrete experience: using paper clips to build the boundary of shapes and using the length of a paper clip as the unit for measuring the distance around each shape.

From there, they transition to analyzing shapes with equal-size intervals marked on their sides or shapes drawn on dot paper or grid paper. They quantify the distance around the shape by counting the intervals or adding the number of units on each side. Later, students find the perimeter of shapes labeled with their side lengths. They learn to leverage the geometric attributes of shapes to find perimeter more efficiently (for instance, by recognizing sides that are the same length and using multiplication).

As they find the perimeter of shapes, students see that different shapes can have the same perimeter and draw shapes with a specified perimeter. Finally, students find missing side lengths of shapes given the perimeter and solve perimeter problems in context.

Section C:

In this section, students analyze the area and perimeter of shapes. They begin by solving contextual problems that require considerations of both measurements. They then draw rectangles with the same perimeter and different areas, and rectangles with the same area and different perimeters.

Students come to see that, given the perimeter of a rectangle, they can find rectangles with different whole-number areas. Likewise, given the area, they can find rectangles with different perimeters.

Section D:

In this section, students apply what they've learned about shapes, geometric attributes, perimeter, and area to solve problems and create designs in different contexts.

Students begin by designing a small park with certain features and then finding the area and perimeter of the park. Next, they examine geometric features in West African wax print patterns and then design their own pattern. Finally, students use their knowledge of area and perimeter to create a drawing of a robot whose parts are rectangles with a certain area or perimeter.

Throughout these activities, students draw on dot paper and use the intervals between dots as a unit of measurement.

Differentiated Instruction

Technology Integration

21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

Resources

Teacher Notes and Reflections
